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LIBRARY MANAGEMENT SYSTEMS IN THE UK: 1960S–1980S

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Computers were first used in libraries for assisting with the processes of cataloguing and the issuing of materials in the collections. This paper traces this history in the UK from the experimental systems of the 1960s, to the local and also the co-operative systems of the 1970s and to the turnkey systems of the 1980s. The rise of microcomputer-based systems and integrated library management systems of the late 1980s are covered in the penultimate section. References are made to published literature of these developments and ‘memories’ of those involved in running and implementing these systems were elicited through an e-mail list and have been incorporated as appropriate.

Introduction

For this review of the early computer-based systems that were used in libraries I have, in the main, limited myself to the UK, but references to comparable work under way in North America are made where appropriate. Sources of information used for the paper are based mainly on published material as well as personal recollections. I worked as the Computer Officer in the College of Librarianship Wales in Aberystwyth from 1972–1979, having graduated with a degree in Computer Science from Manchester University in 1969. During the 1980s I worked independently as an author, lecturer and consultant; *inter alia* writing a review of twenty-one years of computer-based systems in libraries in 1987.¹ A further source of information for this paper resulted from a message sent out to the lis-link email list² in late October 2006 asking for memories of these early computer-based systems. A number of replies appeared — some of which have been included in this paper.

Experimental systems — 1960s

In the early 1960s several libraries in the UK and North America began to experiment with using computers to assist in the processing of information. Most of these systems evolved from the eighty-column punched card data processing systems that had been pioneered by Herman Hollerith to aid in the processing of information from the 1890 US Census. Indeed, the idea for these cards had been given to Hollerith by Dr Billings,

then librarian of the Library of the Surgeon's General Office — the forerunner of the National Library of Medicine.³ Further information on punched card systems and their use in libraries is given in the paper by Black in this issue.⁴ One respondent to my request for early memories noted:

When I first started working in libraries, we had a punched card system at Exeter City Library, Castle Street. I left in 1969, but I remember the clunky sorting machine which needed a room of its own (a small room!) It was an innovative system at the time.

One of the first people who was involved with computer systems in the university sector in the UK was Rollo Woods at Southampton University and his personal memories of this work also appear in this issue.⁵ A paper on the use of an ICT 1907 computer for a loans system at Southampton University was the first paper⁶ to be published in the journal *Program: news of computers in British university libraries* when it was launched in 1966. *Program* celebrated its fortieth anniversary in 2006 with a celebratory reprinting of a small selection of papers along with contemporary commentary.⁷ This journal, a key source for information for this paper, was founded by Richard Kimber, then a Lecturer at the School of Library Studies at Queen's University Belfast (QUB). As Kimber⁸ recalled in 1987, the then Librarian at QUB and Head of the Library School, Peter Harvard-Williams, asked, 'What would you think about editing a newsletter to deal with library automation?', and Kimber replied, 'I thought it was a good idea. The timing was just right: too soon, and it would have not survived; too late and somebody else would have done it'. In the first issue of the new journal Kimber⁹ noted that:

A new wave of enthusiasm is sweeping over the world of libraries in Britain. Librarians see that it is possible to use computers for most clerical operations in libraries. As a result of the recent Flowers Report, more computing machinery will be installed in British universities, and librarians are anxious to stake claims for shares in increased computer time, which will therefore become available ... The purpose of *Program* is to assist librarians in learning about what is beginning to be done in this field, to provide a medium for discussion of the problems involved, and to help establish direct personal contact between those working in similar directions.

Libraries in other academic libraries in the UK were also experimenting with computer systems at this time. For instance, at Newcastle University Maurice Line and colleagues were involved with developing an acquisitions system on a KDF9 computer.¹⁰ Line's recollections of those early days, as well as his involvement with subsequent computer systems at Bath University Library and the British Library, are provided in a paper written for the fortieth volume of *Program: electronic library and information systems*.¹¹ From Liverpool University the development of a finding list of scientific, medical, and technical periodicals held in twenty-eight libraries was reported by Cheesman¹² and, from Essex University, Sommerlad reported the development of a 'machine-readable catalogue'.¹³ A broader overview of these early systems in UK academic libraries and the developments within universities generally at that time is given by Naylor.¹⁴ It was not only within academic libraries that changes were taking place. In the public sector, the London boroughs were reorganized in 1964 and this provided the impetus for many to review systems for dealing with loans and the merging of various forms of library catalogues. Between 1965 and 1968 Camden Public Libraries produced a catalogue on line-printer paper with input on eighty-column punched cards (with two cards per title).¹⁵ The other major public library involved during this experimental phase was West

Sussex which had involved the services of the computer firm, Elliott Automation, in the development of a catalogue and location index.¹⁶ The consultant from Elliott working on this project was Frank Gurney and one memory provided was:

Whilst working at Elliott Automation in the 1960s I remember, when working late, often meeting Frank Gurney at the coffee machine — he was developing a system for libraries.

Also there were examples of some experimental systems from special libraries. Bishop,¹⁷ for instance, described the use of punched cards for the production of lists of periodicals held at the Atomic Energy Research Establishment (AERE) at Harwell.

There were many challenges facing those involved with computer-based systems in those early days:

- Computers were large and expensive and were owned by the parent authority;
- Programmers were needed to write the appropriate software for each application;
- Programs were often written in machine-code language, i.e. the specific computer language for the particular computer, as general programming languages, such as Algol, Basic, COBOL, Fortran, were all rather new;
- The computer technology of the time was not always adequate for the job;
- Computer people thought they knew what library staff required;
- Library staff were not always too sure about what was possible.

In an attempt to overcome the communication difficulties between library staff and computer staff, members of the North-east Division of the Association of Assistant Librarians organized for a series of six lectures to be held under the auspices of the University of Newcastle's Department of Adult Education. The programmers, who were involved in the acquisitions project at Newcastle University Library, gave the lectures. Line recognized the importance of publishing the content of these lectures even though the technology of the time developing fast, and the resulting book was edited by Line, and indexed by his wife.¹⁸ I personally found this to be a very valuable source of information when I was first asked to run a course (which I called *The Library and the Computer*) at the 1973 International Graduate Summer School on Librarianship in Aberystwyth.

There was a range of computer systems being used for library applications in the 1960s, which included:

- Elliott Automation and the 803, 903 and 905 series;
- English Electric and the KDF9;
- IBM and the 360 series;
- ICT (later ICL) and the 1900 series.

There were various working parties of librarians involved in using these specific computers.

In 1968 it was reported in *Program*¹⁹ that Aslib should be requested to form a Computer Applications Group (CAG) which would co-ordinate the separate efforts of the individual working parties. It was proposed that there would be five working parties of the CAG to cover:

- Acquisitions and cataloguing systems;
- Periodical records;
- Circulation;
- Information retrieval;
- Record structure and file manipulation.

In particular the aims of the CAG were to:

- Promote use of computers in libraries;
- Assess existing or evolving systems with aim of developing common systems;
- Communicate findings — by publication, meetings, courses and conferences.

By 1969 the Circulation Working Party of the CAG, chaired by Chris Wilson, Librarian of the AERE at Harwell, had undertaken a comparison of the computer-based circulation systems at AERE, the Atomic Weapons Research Establishment at Aldermaston, Southampton University and West Sussex Public Library.²⁰ One finding related to the reasons given for implementing a computer-based system and included:

- To produce accurate record of items on loan;
- To produce recall/overdue notices automatically;
- To save time at the issue counter;
- To produce statistics of use of stock;
- To give added benefits at lesser cost.

Local systems — 1970s

By the 1970s there were many more libraries beginning to use computer systems successfully. Reasons for this included:

- Improved computer technology and the rise of minicomputers which could be acquired by the library for some processing;
- Experiences of those involved in experimental phase were used in subsequent developments;
- Better communication between librarians and computer people;
- Systems were better designed and managed.

Another development was that the Office for Scientific and Technical Information (OSTI) started to fund work in this area. Southampton University Library received funding from OSTI for its developments and also was the home for the OSTI-funded Library Automation Officer. One 'output' from this officer was the publication in 1971 of a new journal in the field of computer-based library systems — *Vine: very informal newsletter*. Duchesne²¹ noted that OSTI spent £762,900 on grants and contracts on computer-related library and information projects in 1973–1974. One project funded by OSTI was a report, by Wainwright,²² on the computer provision in British libraries which was undertaken by the Research and Development Department of Aslib.

A basic feature of any computer-based circulation system is the recording of details about the item on loan and to whom it is loaned. Although in the US eighty-column punched cards were often used for this, in the UK specialized equipment was developed to enable the accurate recording of the unique numbers for specific copies of books and for the borrowers. The two major manufacturers that had emerged by the early 1970s were Automated Library Systems (ALS) and Plessey. The first ALS system, developed and marketed by Frank Gurney, was installed at West Sussex County Library in 1967, with details of book numbers and borrower numbers punched on to 'cards' of the same size as the Browne issue cards that had been used previously. This information was 'read' automatically by a reader at the issue counter and then copied on to a reel of punched paper tape which was then physically transported to a computer for processing.

By 1971 Young and others²³ at Sussex University had installed the first 'trapping store' which was an electronic storage device capable of holding book numbers so that requested books could be 'trapped' on their return to the library. ALS went on to develop an alternative to the card-based system, known as the label-based system which comprised a non-metallic label mounted in the back of a book. The Plessey Library Pen system was the first light-pen based system used in libraries for reading barcoded labels placed in the books and on borrower cards. Camden Public Libraries installed a Plessey system at the Kentish Town branch in 1972²⁴ and other public libraries at Luton, Oxford and Sutton also were early adopters of this system. Some libraries developed fairly complex numbering systems to enable analyses to be made of stock issues as well as by 'type' of borrowers. For accurate recording of 'who had what out' it was necessary to ensure that the numbers read by these various devices were absolutely accurate and to aid this each number had a Modulus -11 check digit as its last digit. Here is a memory of the ALS system from a member of staff at Sussex University in the mid-1970s:

I remember patching up paper tape and using a wonderful plastic gadget with rotating dial to calculate check digits of rogue records, before the reel of tape was taken across campus to be read in the computing centre.

Another data collection device based on barcoded labels was developed by the UK firm, S. B. Electronics, and was known as Telepen, which stood for teletypewriter and light pen. This was of a different technical design to the Plessey pen and allowed for a more flexible barcode structure which could read alphabetic as well as numeric characters. At Cambridge University the barcode was included along with a Polaroid photograph on the general identification card for each student. A graduate trainee at Bradford University Library in 1973–1974 remembers:

The book and reader tickets were half 80-column cards, with the reader ticket being laminated, both were read in slots in the counter but by light rather than pins. One reader had trimmed the sides of his ticket to make it fit his wallet — so of course it slid around in the slot and couldn't be read.

The three ways in which information was processed by a computer system in the 1970s were:

- Batch processing — where jobs to be carried out by the computer were processed one after another so that there was a linear flow through the system and one job was finished before another was started. This form of processing was suitable for library jobs such as catalogue production, production of order notes to send to booksellers, or listing periodicals held in a library.
- Online processing and time sharing — where a member of the library staff would communicate directly with the computer via a teletypewriter (or similar machine) and the computer would 'share its time' between the various online terminals.
- Remote job entry — which was a linking of batch and online processing as an online terminal would be used to enter a job into a queue of jobs to be batch processed by the computer. This method saved the physical transportation of data from the library as an electronic link could be made via a suitable network connection.

The London Borough of Havering installed a Plessey-based circulation system in 1975 with a minicomputer providing the functions of a trapping store.²⁵ However, as a member of staff remembers:

I was the library end of the system design for the product and I remember vividly the reaction we first received from Plessey about our need for something better than the off-line system they were offering. Their indifference, and the much more welcoming approach of ALS brought us to the point where we were about to sign with ALS. Next thing, cars screeched to a halt outside the Central Library and various 'suits' descended on us, full of promises ... and thus history was changed!

A major development that affected computer-based catalogue systems in the 1970s was MARC (machine-readable cataloguing). The birth of MARC is frequently ascribed to a report on automation at the Library of Congress (LC) in 1963²⁶ which concluded that the bibliographic system within the Library of Congress could be automated within ten years. Work progressed in the US on this format and then, following the decision by OSTI to finance a feasibility study of the requirements into a UK machine-readable bibliographic record there was close collaboration between the British National Bibliography (BNB) in the UK and the LC in the development of this bibliographic format. Between 1968 and 1974 experimental magnetic tapes holding standardized bibliographic records in the MARC format for items published in the UK were available and some twenty libraries received them. Wainwright²⁷ reported on the ways in which these libraries made use of the MARC tapes. By 1974 the BNB had become the British Library Bibliographic Services Division and a number of services based on MARC records were offered. A software package known as MERLIN was under development within the British Library for online book ordering and acquisitions, lending and cataloguing using MARC; for various reasons this did not come to fruition and Robinson described its final state in 1979.²⁸

Aslib's CAG and its various working groups continued their work in the 1970s and produced two impressive surveys. The first, edited by Wilson²⁹ in 1973, reported the results of a questionnaire being sent to 199 libraries with 135 returning acceptable positive responses concerning their use of computers. In this survey of a sample of 135 libraries the breakdown of type of library with computer applications was:

Special	61 (45%)
Public	34 (25%)
University	33 (24%)
Polytechnic, college, school	5 (3%)
Consortia	2 (1%)

Most libraries (53%) had implemented computer-based cataloguing systems. A second survey, also edited by Wilson³⁰ resulted in 170 positive responses. The entry for each library is displayed in a standardized format providing information on the:

- computer facilities used;
- peripheral equipment used;
- bureaux usage;
- computer applications;
- other comments.

For instance the entry for Bath University Library recorded:

- Use of a Burroughs B1726 minicomputer (shared with Finance Department) and an ICL 4-50 mainframe computer for the whole university;
- Various Burroughs peripheral devices (e.g. Burroughs TU 100 badge/card readers, Burroughs TD 700 VDU);

- Cataloguing applications using variable-field records with a short average length of 123 characters and the production of the catalogue in Author, Title, Classified and KeyWord Out of Context (KWOC) order;³¹
- Production of lists of periodicals held;
- An online circulation system.

A respondent remembered the online circulation systems at Bath:

The Library and the Finance department jointly commissioned systems from a firm called Burroughs. I helped design the library circulation module (and later wrote my FLA thesis on the project), which I think went into operation in 1974 or 1975. One quirk was that sharing a computer with finance, when they were doing big tasks like payroll, the circulation system ran very slowly. On one occasion it was taking 3 minutes per transaction — and we had to resort to writing on some old issue slips we still had around.

Staff at Bath also carried out a major evaluation study on catalogue systems in the mid-1970s. The main aim of the Bath University Comparative Catalogue Study³² (BUCCS) was to:

- Investigate the performance of four physical forms of catalogue (line-printer, card, COM film and COM fiche);
- Investigate the performance of four orders of catalogue (name, title, classified and KWOC);
- Ascertain the effectiveness of short entry catalogues.

The following were memories of the catalogue at Bath from the earlier respondent:

Also in the early 1970s Bath converted its catalogue to electronic records. The amount of space available for each record was very limited and the library devised a 'short form' of record. Catalogue cards were marked up by library staff and taken to the computer unit, where data entry staff put the data onto punch cards. Initially the data was output as paper printout and microfilm. A research project on this was, I think, the start of the Programme for Catalogue Research at Bath. This in turn led to the setting up of the Centre for Catalogue Research (CCR), which later became the Centre for Bibliographic Management (CBM), which is now UKOLN.

Co-operative systems — 1970s

As well as a large number of local computer systems developed in libraries during the 1970s there was also a move, helped with appropriate funding from OSTI, towards co-operative systems which enabled the sharing of resources. Brief details are given here of some of the co-operatives.

1. Birmingham Libraries Co-operative Mechanization Project (BLCMP)

The aim of the BLCMP, which started in 1969 and was funded by OSTI, was to provide a co-operative cataloguing system for the libraries of the universities of Aston and Birmingham and for Birmingham Public Library. The hope was that the co-operative approach would increase the range of possible services and would minimize costs by the pooling of resources. Three very different types of library were involved and much time was spent in the early stages on defining cataloguing practices, filing rules and so on³³. By the mid-1970s BLCMP was supplying cataloguing services to nine other libraries including some in polytechnics and some county libraries. The BLCMP cataloguing

record was based on MARC with local information of holdings added. BLCMP was run by a team of full-time staff at Birmingham University which consisted of a Director and secretary, two assistant directors, two library system analysts, a computer officer, a data controller, two programmers and eleven data preparation staff.

2. South Western Academic Libraries Co-operative Automation Project (SWALCAP) SWALCAP also started in 1969, was funded by OSTI and consisted of the university libraries of Bath, Bristol, Cardiff and Exeter. A feasibility study was undertaken between 1969 and 1972 which concluded that a co-operative approach to library automation for circulation systems would cost half as much as individual approaches.³⁴ A loans system was developed co-operatively and finally launched in 1976. A Rank Xerox 530 computer was the main central computer, housed at Bristol University, with terminal equipment (an Alpha LSI minicomputer, a VDU and teletypewriter and ALS data collection units) in each participating library. Some memories of SWALCAP were submitted:

We chose SWALCAP because it offered a circulation system, which BLCMP then did not. We quickly realized we needed one when several small libraries were amalgamated into a new library building in 1976 and we tried to scale up the manual Browne issue systems. Cataloguing was a lower priority, although our ancient type-typewriter that produced catalogue cards was on its last legs, so needed to be replaced with something.

One very good thing about SWALCAP, I think, was the co-operative aspect, certainly in the early years. The customers really had a big say in how the system was run and developed and groups met regularly to discuss all aspects of the system ... It is hard to believe now that the minicomputer which supported the terminals in the library and communicated with the mainframes in Bristol was limited to a maximum of 32K of memory! It certainly made for efficient program writing, although the challenge of adding an acquisitions system to circulation, and cataloguing was one that defeated SWALCAP because of this memory restriction. Neither the minicomputer nor the leased BT data line to Bristol were particularly reliable and I spent many happy hours trying to coax the minicomputer back to life or talking to BT engineers trying to reconnect us to SWALCAP headquarters. All I know about computers was learned by trial and a lot of error — they never warned me about that when I was at library school. SWALCAP's transaction-based charging system was complex and always deeply unpopular with users and it is one aspect we never succeeded in modifying significantly.

3. Other co-operative systems

There were other examples of co-operative systems in the 1970s, including:

- BLAISE-LOCAS — the British Library Automated Information Service and its Local Cataloguing Service could be used in a co-operative manner and Clayton³⁵ described the development of a co-operative cataloguing system for the colleges and institutes within London University;
- LASER — the London and South Eastern Library Region³⁶ which served about eighty-seven libraries with a computer-based union catalogue system developed in 1971 to assist with inter-library lending;
- Project LOC³⁷ — which involved the development of a computer-based catalogue of the pre-1801 books held in London (British Museum), Oxford and Cambridge;
- SCOLCAP — the Scottish Libraries Co-operative Automation Project which was formed in 1973 by a group of librarians representing the national library of Scotland, three university libraries (Dundee, Glasgow and Stirling) and two public libraries (Edinburgh and Glasgow). Gallivan³⁸ provided details of some of the challenges faced in implementing this co-operative.

Many of the co-operatives in the UK produced their catalogue on COM fiche. Interestingly, in the US, the main co-operative, OCLC, produced catalogue cards which then needed to be interfiled in the large cataloguing cabinets of the day. One respondent had memories of COM fiche:

We used the old SWALCAP system for cataloguing and circulation. Cataloguing was done via a dumb terminal and a set of microfiche was produced from this every 3 months. The users had to use the microfiche for checking stock. Inputting the records was monotonous and error-prone and there was no error-checking. A senior subject librarian who shall remain nameless got impatient just before a new run of the fiche and decided to put in a batch of records in a hurry. Unfortunately she forgot to check her records before submitting them so she managed to get part of the MARC coding confused with the title. Hence for the next 3 months we had *Twelfth Night* by a certain William O'Shakespeare on the fiche! It caused considerable amusement and there are rumours that a copy of that fiche is still lurking somewhere around that library ... There are still many mistakes but at least we can correct them quicker these days!

Turnkey systems — 1980s

Although there were many examples of successful library management systems for, typically, separate applications of cataloguing, circulation control and serials control in the 1970s there were also problems. These included:

- Hardware problems — failure of hardware suppliers to supply the necessary items in working order, within the agreed time-scale, at the agreed price and being appropriate for the particular 'job';
- Software — problems arose when software had not been adequately designed, implemented, tested and documented;
- People — the computer system for the library may not have been designed with the real needs of the library's users in mind. There were also examples of lack of communication between computer staff and library and also between the 'keen' person in the library involved with the new computer system — and the rest of the library staff who may not have been so eager for the changed system;
- Financial — inadequate financial resources for acquiring appropriate hardware, developing software, educating and training staff, planning, designing and implementing the system were all possible problem areas.

By the late 1970s and early 1980s there had been much development in computer hardware with minicomputers (from manufacturers such as the Digital Equipment Corporation, Hewlett Packard, Prime and Texas Instruments) as well as microcomputers (such as the Apple, Commodore PET and the IBM PC). In general there was a great decrease in the physical size of this hardware, an increase in processing speeds and storage capacity as well as a decrease in cost.

A particular development resulting from this was the rise of what were known as 'turnkey systems' where the hardware and the software was supplied as an integrated package. Such solutions became common — particularly for circulation control systems. The advantages offered included:

- Little expertise required on the part of the library staff;
- Usually a firm contract price and a predictable delivery date;

- Control of the computer system is within the library;
- More chance of reliable performance as the system would have been tried and tested elsewhere.

Some of the turnkey stand-alone systems were developed by the co-operatives, some by the organizations involved with data collection devices and some by computer companies. Many of these turnkey systems provided a short entry catalogue so that a link could be made between the number of an item being loaned and some bibliographic data for that item. Examples of producers of turnkey systems include:

ALS — the ALS System 5 was a turnkey system which was first used in Derbyshire County Library in 1979 and subsequently in Hertfordshire County Library.³⁹

BLCMP — the BLCMP developed a stand-alone turnkey system known as CIRCO. Loanable items were usually labelled with Telepen bar-codes and the bibliographic record was a subset of the full MARC record. The first CIRCO system was installed at the City of London's Barbican centre in 1982 with further systems being installed at the polytechnic libraries of Manchester,⁴⁰ Middlesex and Portsmouth.

CLSI — the US firm, CL Systems Inc., developed a system known as the LIBS 100 which, by the early 1980s, was being used in about 450 libraries in Canada, Northern Europe and the US. Coventry City Library and Coventry (Lanchester) Polytechnic wished to implement a joint turnkey system in the 1980s and Manson⁴¹ describes the LIBS 100 system that was implemented there.

Geac — the Geac Computer Corporation of Canada developed a turnkey system which was first used at the university libraries of Guelph and Waterloo in Canada in 1977. Several libraries in the UK decided to implement a Geac system in the early 1980s and Young and Stone⁴² describe the replacement of the ALS card-based system at Sussex University Library with a Geac system.

Plessey — in late 1980 Plessey launched its stand-alone turnkey system, known as the Module 4 library management system, having tested a prototype at Calgary Public Library in Canada in the late 1970s. Kent County Library in the UK installed a module 4 system for use in its twenty-six branches in 1982.⁴³

Online public access catalogues (OPACs) — 1980s

The turnkey systems described in the previous section enabled users to search the library's catalogue database in order to see if a particular item was held in the library, be informed of its location and, if the catalogue system was linked to the circulation system (as many were), be told whether or not the item was currently available for loan. Rowley⁴⁴ provides an overview of OPAC developments in the early 1980s. These first generation OPACs were often referred to as 'phrase indexed' or pre-coordinate OPACs and provided access via author, title (as a phrase), or class mark in a way similar to the COM fiche catalogues of the 1970s. Derived, or acronym, keys were also used as a search mechanism (e.g. 'tedd,luc,a', for an author search) or a combination of author/title information might be used. These OPACs were good when searching for a known item (i.e. when the author and/or title of a work was known). The next (second) generation of OPACs were based on the information retrieval techniques developed by the online search services, such as Dialog, in the 1970s and were also known as keyword or

post-coordinate OPACs. Access points in such OPACs were words from the title, subject headings or author fields and search statements could be compiled by linking the search terms using boolean operators. Some second generation OPACs had two levels of user interaction: a simple one for inexperienced or novice searchers and a more advanced one for more experienced searchers. A special issue of *Program* in 1986 (20:2) concentrated on OPACs and included papers outlining relevant developments in Australia, North America as well as in various libraries in the UK, e.g. Bagnall and Jeffreys⁴⁵ described the use of the OPAC in OCLC's LS/2000 library management system. Bowman⁴⁶ provides a general overview of online catalogues and user reactions to them.

A major development related to OPACs in the 1980s was the establishment, by the Computer Board for the Universities and Research Councils in 1984, of the UK's Joint Academic Network (JANET). Using this network it was possible to search an OPAC from somewhere other than the particular library running the OPAC — i.e. remotely. A printed booklet giving details of the OPACs in the UK that were available via JANET was produced, and updated periodically in the 1980s, at Sussex University Library.

Microcomputers and integrated library management systems — late 1980s

Microcomputers had been used in libraries since the early 1980s and Burton's report⁴⁷ in 1983 of a postal survey of 742 academic libraries which aimed to assess the current and planned use of microcomputers found that 13.21% (98 libraries) used microcomputers 'for a wide variety of tasks although the overall emphasis was on the automation of housekeeping routines'. A series of six papers on the microcomputer in the library was published in the journal *The Electronic Library* (which was launched in 1983 and published by Learned Information in Oxford). The fifth in the series covered microcomputers for circulation control and serials control.⁴⁸ Manson⁴⁹ outlined the basic requirements for any library management system to be described as 'integrated' as:

- Providing consistency and integrity of data across all applications. For instance, changes in data in a catalogue record would be reflected in the databases supporting the circulation or acquisitions systems;
- Transaction, such as placing an order or recording a loan should update the 'status' of the item — which would be viewed through the OPAC;
- There should be easy movement between the various functions of the system.

She also provided details of seventeen library systems, sold and supported in the UK which ran on microcomputers.

In 1986 a buyer's guide to integrated library management systems was produced by Juliet Leeves⁵⁰ and was compiled under the auspices of the Centre for Catalogue Research at Bath University with funding from the British Library Research and Development Department (BLR&DD — the successor to OSTI) and in collaboration with the Library Technology Centre (LTC) at the Polytechnic of Central London. The LTC (later known as the Library and Information Technology Centre (LITC)) had been established in 1982, with funding from the BLR&DD, to:

- provide demonstrations of the wide range of software systems that might be used in the libraries of the time;

- answer specific enquiries and provide advice to library staff;
- run relevant workshops and seminars;
- disseminate information via the journals *Vine* (which it had taken over from Southampton University) and *Library Micromation News*.

By the mid-1980s *Vine* had developed from being a Very Informal Newsletter to a journal covering applications of technology in libraries, with a special emphasis on library housekeeping systems in the UK. *Program* too had developed and was now called *Program: automated library and information systems*. It had become a refereed quarterly journal, with an active international Editorial Board and was published by Aslib, The Association for Information Management. The LITC provided much useful advice — specifically to smaller libraries (e.g. school libraries) which were amongst the academic libraries identified by Burton as using microcomputer-based systems for helping to manage housekeeping processes in the library.

By the end of the 1980s integrated library management systems were available for a variety of housekeeping function using a variety of types of computer, including microcomputers. These systems typically provide modules for:

- Cataloguing materials (perhaps using MARC records imported from an external source);
- Providing access to the catalogue for users (i.e. an OPAC);
- Circulation control;
- Acquisitions and order processing;
- Serials control (possibly);
- Interlibrary loans (possibly).

In the introduction to the second edition of her guide, Leeves⁵¹ noted:

The use of computers in libraries is now commonplace. Librarians are increasingly involved in the evaluation, selection, and implementation of library systems from large, minicomputer-based systems supporting hundreds of terminals in public libraries to single-user, PC-based systems in special or school libraries.

Examples of the some of the library management systems of the late 1980s which are covered in that overview include:

ALS — System 88. Cowley, who had been Assistant Borough Librarian of Bromley Public Library and the secretary of the ALS user group, describes the development of various products from ALS over the years.⁵² Most of the UK users of System 88 were in public libraries (e.g. Bradford City Library and Cheshire County Library). During the 1980s ALS moved in to the European market with customers in France, the Netherlands and West Germany.

BLCMP — BLS. The BLCMP's Library System developed from the CIRCO system of the early 1980s and is described in more depth by Stubley,⁵³ who had been involved with implementing the system at Birmingham Polytechnic Library. By the end of the 1980s, BLS systems were used in a number of polytechnic libraries (e.g. Kingston, Leicester, and Middlesex) as well as in public libraries (e.g. Guernsey and Northamptonshire County) and in university libraries (e.g. Bradford, Brunel and University College Dublin).

CLSI — LIBS 100. CLSI continued to develop its system during the 1980s by including modules for serials control and for community information. Examples of users included the Falmouth College of Art, London Borough of Croydon⁵⁴ and the University of Reading.

DS — Galaxy. DS was formed in 1983 as a result of the telecommunications company, Plessey, selling off the part of its company that had developed the various library

systems. The Galaxy system evolved from the Plessey Module 4 and proved to be particularly popular with British public libraries (e.g. Aberdeen City, Bedfordshire County and Hampshire County).

Dynix — Dynix Library System. Dynix appeared in the UK market in 1988 as an offshoot of the US parent company which had developed its first library management system in 1983. Anley and Mullner⁵⁵ describe the implementation of a Dynix system at the Royal Borough of Kensington and Chelsea which replaced a previous Plessey-based system in 1987. Other examples of UK libraries with Dynix included Dundee College of Technology, Harrow College of Education and Trinity College Dublin.

Geac — Geac Library Information System (GLIS). The GLIS developed from Geac's original system and continued to be based on proprietary hardware and software. Extra modules were added during the 1980s, including an interlibrary lending module. GLIS was installed in hundreds of libraries worldwide in the 1980s and also had a multilingual (up to eight languages) user interface. Dunbar⁵⁶ described the implementation of GLIS at Lancashire County Library. Other examples included the University College of North Wales, Bangor, University of Edinburgh and Westminster City library. One respondent had memories of Geac in the 1980s:

I have some fond memories of the old Geac GLIS 8000 system, which we implemented in 1984 and I started managing in 1986. I remember physically large and heavy disk drives, which the engineers often needed help lifting, which stored relatively small amounts of data by modern standards, and of quite complicated rebooting processes which took about 10 minutes to complete and involved watching for patterns of lights on the front of the server. We also did a lot of offline processing to produce overdue, orders and so forth, and transfer items from ACQ to Circulation. We had two control terminals which we had to remember to put into automatic running every evening when we left — they kept in step with each other, one waiting for the other to catch up before it did its next job. Tape back-ups were done on to spool tapes — between 12 and 16 a day. They took about 10 minutes to run, then you had to change to the next one. We used an egg timer to remind staff to go and change the next one. We used solvent and cotton buds to clean the tape deck each week. Offline (micro back-up) was run on Commodore PETs using fairly fragile 5.25" floppies; it was written in BASIC.

IBM — DOBIS/LIBIS. This system was developed by Dortmund University in Germany and Leuven University in Belgium in the 1970s and was first installed in a UK library in 1985. Manson⁵⁷ describes the use of DOBIS/LIBIS at Liverpool University Library. There was never a large number of DOBIS/LIBIS users in the UK; other examples included Bristol Polytechnic, the Foreign and Commonwealth Office and the University of Oxford.

IME — TINLib. Information Made Easy (IME) developed the TINlib range of products in the 1980s which were based on a database management system, TINman, that the company had also developed,⁵⁸ with TIN standing for The Information Navigator. Various optional modules such as TINlend (for interlibrary lending) and TINterm (for thesaurus control) were also available. TINlib was used in a number of special libraries in the UK including the British Council, Society of Antiquaries London and the Wellcome Research Laboratories.

McDonnell Douglas — URICA. The US aerospace corporation McDonnell Douglas acquired MicroData, a minicomputer manufacturer which had acquired the URICA library management system developed at Amalgamated Wireless Australasia. The National Library of Wales was an early user of URICA in Europe as it chose this system in 1984 to satisfy its requirements for a fully bi-lingual (English/Welsh) system.⁵⁹ Other

users of URICA included Bath University, East Sussex County Library and the Natural History Museum.

SCSS — Bookshelf. Specialist Computer Systems and Software (SCSS) took over the marketing and further development of the multi-user version of Bookshelf, which had originally been developed for a microcomputer (and known as Bookshelf-PC) by a consultancy firm, Logical Choice, for the Cairns Library at the John Radcliffe Hospital in Oxford.⁶⁰ By the end of the 1980s there were many users of SCSS' s Bookshelf including Dumfries and Galloway Regional Library Service,⁶¹ Llanelli Borough Council and Willesden College of Technology.

SLS — Libertas. The stand-alone system, Libertas, developed by the SWALCAP Library Service (SLS) was designed with assistance from many of the systems librarians who were working in libraries of that co-operative. Libertas was launched in 1986 and Mellows⁶² describes its implementation at the University of Wales College of Cardiff where it was networked between nine site libraries. Other users included Cranfield Institute of Technology, Leeds Polytechnic and University College London.

Conclusions

In a look back at library management systems for the 100th issue of *Vine* in 1992 the consultant Juliet Leeves⁶³ wrote:

I well remember the heady days of library automation when the Geac system was the best thing since sliced bread and Janet was just a girl's name. This was in 1979 when Geac introduced the first turnkey system into the UK which gave us our first taste of online access to catalogues in the form of a query function to a short entry catalogue file. No matter that it was rudimentary (essentially offering a browsing function on author, title and classmark) it was light years away from the static card and fiche catalogues, providing for the first time status information on copies, updated in realtime, together with the facility for users to reserve items themselves.

This review has shown that the developments that took place from the experimental systems of the 1960s to the 'accepted' norm in the 1980s were great. As one respondent wrote of his memories:

Quite a lot of late working — and a handful of working in the Library throughout the night. Memories of the systems we managed to boot out are perhaps more intense: three slip issue systems: borrower filled out a three part slip for each book, kept one themselves and the Library filed one by author's name and the other by borrower's name. Then both of those had to be de-filed when the book came back. Phew. Young members of staff these days refuse to believe we did such things! I suppose one thing I'd say, looking back, is that if we'd really known what we were doing we'd probably have been too scared even to try.

* * *

Further reading

If any readers wish to read more about the developments described in this paper and to examine sources used for this paper, other than those cited, see the three editions of my

An introduction to computer-based library systems.⁶⁴ Information on library management systems after the late 1980s can be found in the essays I have contributed to John Bowman's *British librarianship 1991–2000* and *British librarianship 2001–2005*.⁶⁵

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I would like to thank all those who replied to my e-mail asking for memories of early library management systems.

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